UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,484	11/28/2001	Yen Choo	8325-2008	2713

20855 7590 04/28/2009

ROBINS & PASTERNAK
1731 EMBARCADERO ROAD
SUITE 230
PALO ALTO, CA 94303

EXAMINER	
DUNSTON, JENNIFER ANN	
ART UNIT	PAPER NUMBER
1636	

MAIL DATE	DELIVERY MODE
04/28/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

CONTINUATION SHEET

Applicant's arguments, see pages 2-5, filed 8/4/2008, with respect to the rejection of claims 34 and 48 under 35 U.S.C. 112, first paragraph, have been fully considered and are persuasive. The previous rejection of claims 34 and 48 has been withdrawn.

Applicant's arguments, see page 5-6, filed 8/4/2008, with respect to the rejection of claims 34 and 48 under 35 U.S.C. 112, second paragraph, have been fully considered and are persuasive. The previous rejection of claims 34 and 48 has been withdrawn.

With respect to the rejection of claims 34 and 48 under 35 U.S.C. 103(a) as being unpatentable over Gilman et al (WO 96/06110), Applicant's arguments filed 8/4/2008 have been fully considered but they are not persuasive.

Claim 34 is directed to a complex comprising a heterodimer comprising a first and second polypeptide, wherein the first and second polypeptides bind to DNA and the first or second polypeptide comprises an engineered, non-naturally occurring Cys2-His2 zinc finger binding domain, and a ligand that binds to the first and second polypeptides and mediates heterodimerization of the first and second polypeptides.

Claim 48 is directed to a switching system comprising a first and second polypeptide and a ligand in which the first polypeptide binds to the second polypeptide to form a heterodimer and the binding of the first and second polypeptides is mediated by binding the ligand to the first and second polypeptides, wherein the first and second polypeptides bind to DNA and the first or second polypeptide comprises an engineered Cys2-His2 zinc finger DNA binding domain.

The specification defines the term "a non-naturally occurring binding domain" to mean that "the binding domain does not occur in nature, even as part of a larger molecule, and has

been obtained by deliberate mutagenesis procedures or *de novo* design techniques." See page 3, lines 29-32.

The response asserts that Gilman fails to teach or suggest anything about engineered zinc finger proteins in addition to failing to teach anything about non-naturally occurring Cys2-His2 zinc finger binding domains.

This argument is not found persuasive. Gilman et al teach that suitable component DNA binding domains include naturally occurring zinc fingers of the C2H2 (i.e., Cys2-His2) class (e.g., page 5, lines 14-16 and 27-35). However, the teachings of Gilman et al are not limited to naturally occurring Cys2-His2 zinc finger domains. Gilman et al teach that an existing Cys2-His2 DNA binding domain can be modified, or engineered, to decrease, increase or change the recognition specificity of DNA binding (e.g., page 10, lines 4-6). Specifically, Gilman et al teach that in zinc fingers, substitutions can be made at selected positions in the DNA recognition helix (e.g., page 10, lines 11-13). Thus, Gilman et al teach the application of deliberate mutagenesis procedures to create a non-naturally occurring zinc finger sequence that has been designed to bind a particular target sequence (e.g., page 1, lines 12-15; page 10, lines 4-15). The mutagenized naturally occurring zinc finger of Gilman et al is consistent with the definition of "non-naturally occurring" provided in the instant specification. Accordingly, Gilman et al do teach engineered zinc finger proteins that are non-naturally occurring Cys2-His2 zinc finger binding domains.

The response asserts that Gilman fails to teach, suggest or enable complexes as claimed in which heterodimerization of first and second DNA binding domains is mediated by a ligand

that binds to the DNA binding domains. The response notes that Gilman teaches fusion proteins comprising a DNA binding domain and immunophilin ligand-binding domain.

These arguments are not found persuasive. The instant claims do not require the ligand to bind directly to the DNA binding domain as suggested by Applicant. Rather, the claims only require the ligand to bind the first polypeptide and second polypeptide, where each polypeptide comprises a DNA binding domain. The claims do not prohibit the inclusion of a second domain in each polypeptide where the additional domain binds the ligand. Thus, the DNA binding domain and immunophilin ligand-binding domain fusions of Gilman et al read on the first and second polypeptide of the rejected claims.

The response notes that Gilman teaches the covalent linkage of DNA binding domains. Further, the response notes that Gilman only exemplifies DNA binding domains that have been covalently linked. The response asserts that Gilman does not teach or suggest the claimed complexes in which the ligand mediates heterodimerization by binding to the DNA-binding polypeptide.

These arguments are not found persuasive. Although Gilman et al do teach the covalent linkage of DNA binding domains, the reference is available as prior art for all that it teaches. At the paragraph bridging pages 2-3, Gilman et al state the following:

> It bears repeating, and should be kept in mind by the reader, that the composite DNA binding protein in certain embodiments is a single chimeric protein containing multiple and covalently-linked copies of one or more DNA-binding domains, while in other embodiments the composite DNA-binding protein comprises two (or more) "subunits", each of which is a chimeric protein in its own right containing at least one DNA-binding domain. In the latter case, the composite DNA-binding protein comprises two or more such subunits in a multimerizer-mediated association.

Thus, it is clear that Gilman et al teach two polypeptide subunits, where each subunit comprises a DNA binding domain, and the DNA binding domains are brought together by a ligand in what Gilman et al call multimerizer-mediated association. Gilman et al teach the multimerization of at least two chimeric proteins, each comprising at least one binding site for a multimerizing ligand, and at least one component DNA binding domain, such as a modified Cys2-His2 zinc finger, where the DNA binding domains are brought together in a complex by the ligand (e.g., page 5, lines 4-12; page 7, lines 29-31; sentence bridging pages 7-8). Gilman state, "the transcriptional activation domain may be present on a chimeric protein which further contains one or more component DNA-binding domains, which is capable of dimerizing, in the presence of a dimerizing agent, with another chimeric protein of this invention bearing a ligand-binding domain and one or more additional component DNA-binding domains." Furthermore, Gilman et al teach that the design of chimeric proteins comprising ligand binding sites capable of ligand-mediated multimerization was known in the art (e.g., page 5, lines 8-12; page 8, lines 9-19). Thus, Gilman et al do teach the claimed complexes in which the ligand mediates heterodimerization by binding to the polypeptide comprising the DNA binding domain as claimed.

The response asserts that the Gilman reference does not place the public in possession of ligand-mediated heterodimeric complexes as claimed. The response asserts that Gilman only discloses covalent linkage of DNA binding domains; however, Gilman teaches the ligand-mediated association of DNA binding domains in addition to covalent association. See the discussion above.

Gilman et al teach each element of the claimed invention and placed the public in possession of the presently claimed invention. For these reasons, and the reasons made of record in the previous office actions, the rejection is maintained.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer Dunston whose telephone number is 571-272-2916. The examiner can normally be reached on M-F, 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Low can be reached at 571-272-0951. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer Dunston, Ph.D.
Examiner
Art Unit 1636

/JD/

/ Christopher S. F. Low /
Supervisory Patent Examiner, Art Unit 1636